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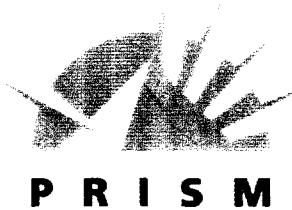
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FEDERAL COMMUNICATIONS COMMISSION  
OFFICE OF THE SECRETARY



Prism Communication Services, Inc.  
1667 K Street, N.W. – Suite 200  
Washington, DC 20006  
(202) 263-7979 TEL  
(202) 263-7978 FAX

November 2, 1999

BY HAND DELIVERY

Ms. Magalie Roman Salas  
Secretary  
Federal Communications Commission  
Washington, D.C. 20554

Re: CC Docket No. 99-295  
Prism Communication Services, Inc.  
Ex Parte Presentation

Dear Ms. Salas:

Pursuant to Section 1.1206 of the Commission's rules, this is to advise you that, in my capacity as counsel to Prism Communication Services, Inc. ("Prism"), I, along with representatives of Prism and Jim Halpert of Piper Marbury Rudnick and Wolfe, LLP, met today with staff from the Commission's Common Carrier Bureau (the "Bureau").

Present at this meeting were Prism representatives, Sophia Corona, Vice President Network Planning, and Renée Crittendon, Deputy Chief Counsel – Telecommunications. Also present were Bureau staff representatives Eric Einhorn, Jessica Rosenworcel, Johanna Mikes, Daniel Shiman, Claudia Pabo, Julie Patterson, Alex Belinfante, Raj Kannan, Rhonda Lien and Deborah Ramirez.

During this meeting, we discussed Prism's position with respect to Bell Atlantic's 271 Application for the State of New York. The subjects discussed included those already reflected in Prism's written comments in this proceeding. Copies of the enclosed documents, which describe Prism's services and its position in this proceeding, were distributed.

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November 2, 1999

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In accordance with the Commission's rules and directives in this proceeding, I am hereby submitting one copy of the confidential portion of this filing and an original and two copies of the redacted version of the entire submission.

Any questions regarding this matter should be directed to Marni J. Shapiro of Prism at the address listed above.

Sincerely,



Julie A. Kaminski  
Deputy Chief Counsel - Telecommunications

/jak  
Enclosures

cc: (without enclosure)

Eric Einhorn  
Jessica Rosenworcel  
Johanna Mikes  
Daniel Shiman  
Claudia Pabo  
Julie Patterson  
Alex Belinfante  
Raj Kannan  
Rhonda Lien  
Deborah Ramirez

cc: (with enclosure)

Dee May (redacted)  
Jim Halpert

**PRISM'S POSITION IN DOCKET NO. 99-295**  
**BELL ATLANTIC'S 271 APPLICATION FOR THE STATE OF NEW YORK**

Bell Atlantic fails to provide access to unbundled network elements ("UNEs") on terms and conditions that are just, reasonable and nondiscriminatory.

- **Bell Atlantic fails to properly complete loop installations.**

For example:

- Bell Atlantic fails to show up for installations as scheduled.
- Bell Atlantic fails to test for dial tone or tag the relevant circuit prior to closing out the order.
- Bell Atlantic's systems and processes are not set up to timely notify Prism whether or when installations have been completed.

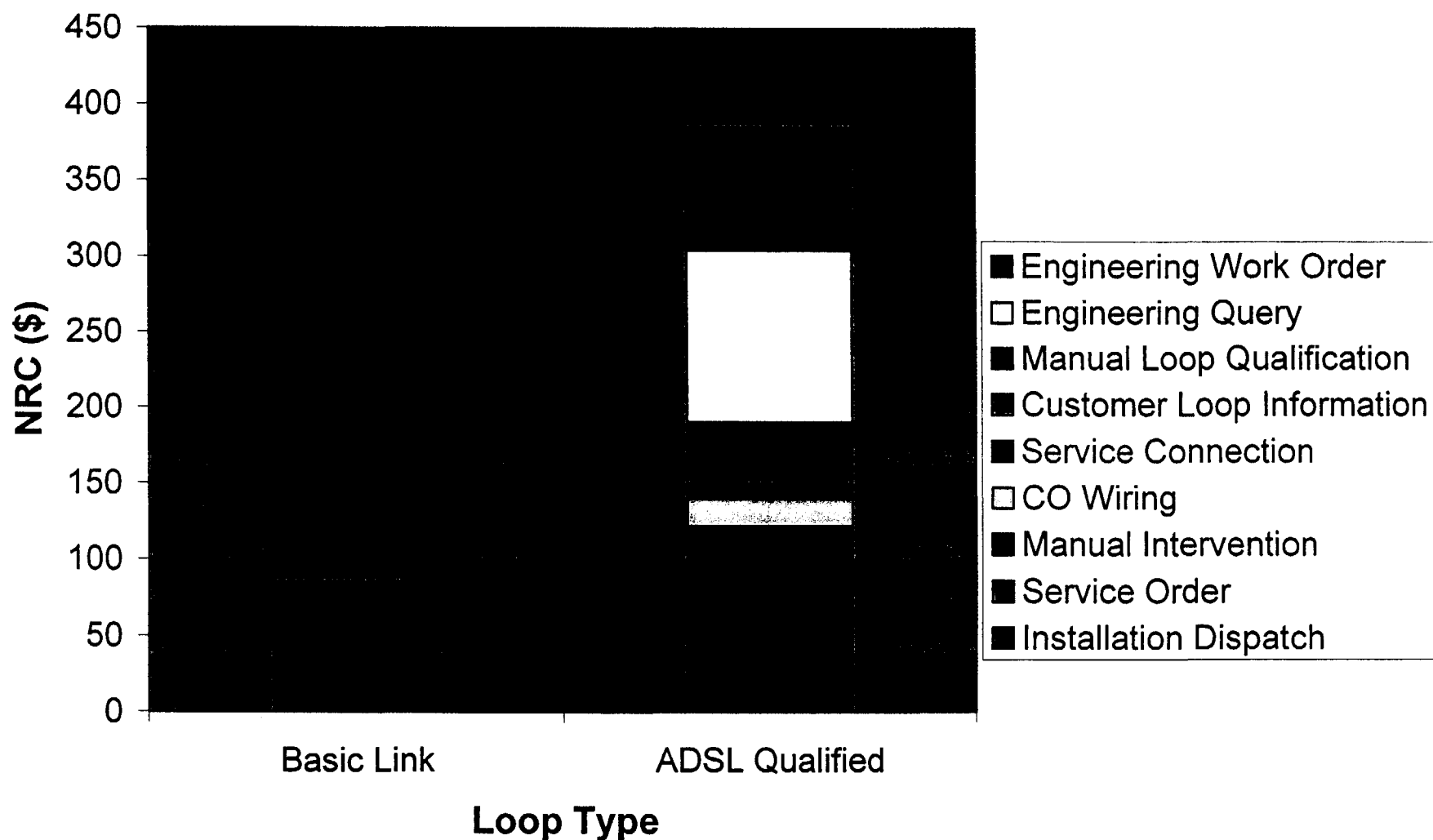
- **Bell Atlantic imposes unlawful and unreasonable restrictions on its loops.**

For example:

- Bell Atlantic unlawfully attempts to restrict the use of its basic, two-wire loop to a specific bandwidth range thereby prohibiting non-interfering technologies operating on their loops outside that range.
  - Bell Atlantic unlawfully attempts to require Prism to purchase an xDSL qualified loop in order to guarantee end-to-end copper.
  - If Prism is nevertheless required to purchase xDSL qualified loops, Bell Atlantic seeks to prohibit hot cuts, thereby interrupting voice services on those loops or requiring the purchase of a second line.
  - Bell Atlantic seeks to unilaterally terminate a CLEC's loop if Bell Atlantic determines it is causing interference, ignoring the CLEC's right to dispute that determination and failing to address what transpires if Bell Atlantic's loop causes the interference.
- **Bell Atlantic fails to timely and accurately deliver Local Interconnection Facilities.**

**REDACTED**

## Bell Atlantic Proposed Tariff Offering #916



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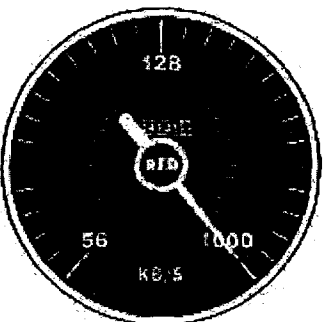


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## Technology

GARY KRAKOW ON TAKL-ALONG TECH

# DSL: One man's life in the fast lane



**First impressions of my experience range from good to bad to very ugly**

Red Connect offers inexpensive 56K modem dial-up, 128K ISDN and 1MB DSL service. Throughout New York, their signs proclaim: "Red Means Go." Now that it's up and running in my house, I know they ain't kidding.

Red Connect / PRISM

By Gary Krakow  
MSNBC

Oct. 8 — When I started playing with computers, just a few years ago, 300-baud modems were a big deal. Then, 1,200- and 2,400-baud modems followed. At some point someone announced that 9,600 baud was the "theoretical limit" for phone lines. After 14,400, 28,800, 33,600 and 56,000, I suffered with ISDN. A year or two ago, people were saying near T-1 speeds were coming on those same phone lines. Something called Digital Subscriber Line service. DSL. It's October 1999, it's here, and I can happily report IT WORKS!

● COMPLETE STORY →

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It's as fast as or faster than my connection at work. I've been online constantly, and the Red connection hasn't even blinked in the three to four weeks since it was installed.

NOW, WHEN I LOG ON, it says I'm connecting at 10,000,000 bps. That's really cool. Now, there's almost no difference between downloading a file at home or on the LAN in the office. I recommend it to everyone who's serious about getting on the Web.

I wish the story were that simple. I've wanted a high-speed line since the first time I heard about them. I've found that New York City is not the capital of high-tech capabilities that everyone here would like you to believe. My cable provider, Time Warner, is slowly re-wiring Manhattan for improved services. Very slowly. They're telling me I can have their new expanded cable TV choices and their RoadRunner cable modem service sometime in 2001.

Bell Atlantic, the giant Baby Bell here in the northeastern U.S., has been promising DSL service for months. For the past year or so, they would say it will be available in 30 to 60 days in my area. The other heavily advertised service being promised was from a

newcomer named Red Connect. They were also promising DSL, always "in the next quarter." I decided despite Bell Atlantic's track record with botching my ISDN service for years, I would go with whichever one would wire my house first. I called both, every month, to check on their progress.

My heart skipped a beat in August as a Red Connect operator said to me, "When can we come to install a line?" I told them to "come on down!" We made an appointment for 10 days later. I also decided that it might be a good idea to check in with Red's public relations department to make sure they knew I was going to be writing about all this. I've found that dealing with phone companies and new technologies, I've needed all the help I can get. Good thing I did. Without Red's help, I'd probably still be waiting for something to happen.

Guess which line is mine. Actually, that's a trick question. I took this picture while touring Red's new communications headquarters in lower Manhattan. My DSL "line" resides in a Bell Atlantic central office in a different location.



Gary Krakow / MSNBC

That's because Red has to contract with the local phone company, Bell Atlantic, to provide a phone line for the service. (Think about that for a second. Red can offer DSL service

into my home; Bell Atlantic can't, even though the wire comes from the same place ... Bell Atlantic's office building serving my neighborhood!) Red charges \$300 to have a regular POTS (Plain Old Telephone Service) phone line installed in your home, run wires, install a jack at your computer, configure the service at their office, and then make sure everything is running properly. After what we went through, \$300 seems like a bargain!

Even though Bell Atlantic said they'd install the line on that Thursday afternoon, they weren't able to connect that line, at both ends, for nearly six days. And that included various calls from me; numerous calls from the people at Red; a huge amount of BA finger-pointing (claiming everyone else was responsible for the problems).

The best part of this experience came after contacting a Bell Atlantic spokesperson and asking them for help. I received a return call from one of their





press people who was markedly upset that I had complained about something on a Friday afternoon and that she was still working on Friday evening to try to solve the problem. I can only imagine what everyone else does. You know, all the people without press contacts who have to ask Baby Bell for help with solving a problem. Finally, I hope Bell Atlantic doesn't drop the ball like they did in my case every time a local telephone provider needs a line installed.

Red sent me this photo of one of their DSL set-ups. You can easily spot the Nortel 1Meg Modem, painted red for the occasion. Don't worry, yours will be beige.



Red Connect / PRISM

Once BA figured out how to plug in the line, Red Connect's DSL service came to life. As promised, the service runs on a regular, two-copper-wire, POTS phone line. The line attaches to a Nortel "1-Meg Modem" which provides a constant, lightning-fast connection to the Internet. Notice, I said constant. The modem connects to your computer through a 10Base-T Ethernet port. Red provides you with your own IP address, and that means your computer is always "on the 'Net.'" No more dialing.

I tried plugging Red Connect directly into my computer. I also tried connecting it to my home LAN through a Red Connect/Bay Networks router. The router takes the single IP address and serves up the line to many computers at the same time. It also provides a layer of protection against hackers and crackers. You can actually make your own "router" by running special software (free with Linux distributions and available separately for Windows and Mac) on one of the computers in your network.

As for my current set-up, I assume that soon we're going to see all-in-one boxes, with DSL modem, router and Ethernet hub all in one, small enclosure. Similar to 3Com's ISDN LAN Modem I've tested (and loved) in the past. It will be more aesthetically pleasing than my pyramid of flashing lights, wires and boxes (modem, router and hub) near my computer.

Then, I encountered another situation. I needed to “tunnel” into a separate ISP, via PPTP tunneling software. The PPTP protocol creates a “secure,” one-to-one connection with the computer system at the other end, via the Web. Unfortunately, it wouldn’t work using one IP address and the supplied router. So, Red was kind enough to lend me a few additional IP addresses. Now my home computers, each one with a separate IP address, can “tunnel” into other ISP locations.

### TALK AND SURF

The same POTS phone line that handles the DSL service also handles regular phone service. At the same time. That means you can talk on the phone and maintain a fast-speed connection to the Internet. Or send faxes, or have another device use a regular modem while you have the DSL connection going. At the moment, Red provides only a dial tone on the line. They plan to roll out the voice service in the very near future.

### The Tech array

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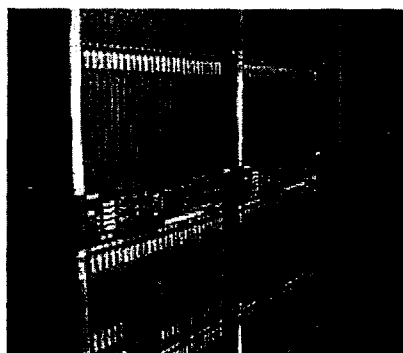
At this point, there are no industry standards for DSL. So, I’m stuck using the Nortel equipment provided by Red (not that there’s anything wrong with that). When standards are approved, the protocol Red uses should be called G.992.2 (or G.lite). The competing protocol will be called G.992.1 (G.dmt). (Whatever happened to catchy titles?) One feature of the G.lite protocol is the actual signal splitting of voice calls and DSL information is done at the Red Connect end, not at your DSL modem (fewer additional boxes to worry about).

Here is one of the many racks  
containing some of the



Red service

Containing some of the mechanism Red uses to connect your phone line to their service. Inside, there are DSL modem and voice telephone cards for every account. In phone company parlance, all of this is known as a "switch"



Gary Krakow / MSNBC

currently maxes out at just below 1Mbps for downloads and 120kpbs for uploads (Red's numbers). Notice it's not the same for up- and downloading information. That's why this is called ADSL, the "A"

standing for "asymmetrical." Red plans to upgrade its main computers in the next few weeks to allow 1.3Mbps down (approaching T-1 speeds) and more than 300Kbps up. The upgrade is done in their office. It's all automatic.

ADSL itself is theoretically (there we go again) capable of speeds of up to 8Mbps downstream and 1Mbps upstream. I think we're a few short months/years from seeing numbers like that. As for who can have it, ADSL service in your home depends on how close you are to a phone company central office (C.O. in phone company parlance). Just like with ISDN service, if you're more than 18,000 feet (about 3 miles of wire) from your C.O., fuhgeddabowdit! The closer the better. Call me lucky.

### PERFORMANCE AND COST

In a word, it works "flawlessly." I have downloaded files faster than the 1Mbps Red Connect limit. It's as fast as or faster than my connection at work. I've been online constantly, and the Red connection hasn't even blinked in the three to four weeks since it was installed. I don't want to jinx anything, but so far, so good.

In addition to the one-time \$300 start-up charge, Red has three levels of service. HomeWork, with 640Kbps downstream and 120Kbps upstream, goes for \$79.95 a month. PowerWork, with 1 Mbps down and 120Kbps up, is \$149.95 a month, and Red's NetWork, with speeds equal to PowerWork, plus the router and six e-mail accounts, is \$349.95 a month. The startup charge for Red's network service is \$399.95. It sounds expensive, (and everything always costs more in NYC) but remember this includes rental of the modem (others make you buy one), the 24/7 Internet connection, and all ISP charges. When the technology changes, Red says they'll upgrade your modem as part of their service.

If you know what T-1 lines cost per month, or how

ISDN "per minute/per channel" charges add up, DSL starts to look like a bargain (even in the Big Apple).

Yes, I know that cable modem service is generally advertised as being less expensive each month. And, yes, at the moment they have the ability to send information at nearly three times the speed of DSL. But, according to people who work here at MSNBC, live in New Jersey and have '@Home' cable modem service, speed rates plummet when many people in their neighborhood use their cable modems at the same time. With DSL, you have a one-to-one connection with your ISP. Your speed is not affected by other people using the same exact wire (although it could be affected by lots of people using the same ISP, and Internet use in general). More importantly, I had no choice. I'll have to wait more than a year to try a cable modem here in New York City. DSL was the only way for me.

Finally, I want you to know I'm into DSL for the long haul. This will be an ongoing test. I intend to stick with the Red Connect folks and their service to see what happens over the next few weeks, months and years. Who knows, maybe I'll have T-3 speeds in my home real soon. Vroom!

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#### **TECHNOLOGY TOP STORIES**

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- STORY** Napoli: Why I don't live at the Post Office
- STORY** A master's in your jammies
- STORY** Trouble in DSL paradise
- STORY** Intel, Microsoft to join Dow index

#### **TECHS, TOYS AND TRICKS**

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## Solutions for Ubiquitous High-speed Data Network Access Services

*A Belcore White Paper by Charles H. Woloszynski*

*"...In 1989 Bellcore dreamed up a radical idea for using ordinary twisted-pair telephone lines to transmit information in video, image, and dense graphic formats..." Kim Maxwell, Independent Editions, ADSL Forum*

### *Abstract:*

High-speed Internet access based on ADSL (Asymmetric Digital Subscriber Line) technology is transitioning from a vision into reality. In this paper, we will look at the current state of ADSL's deployment and identify challenges to the successful acceptance of ADSL as a mass-market service. First, we review the current deployment approaches being used in the industry. This review includes the business model and the service architecture. We examine these approaches and provide some insight into the advantages of each, leading up to a projection of what issues future ADSL service offerings will need to address. We then assess two major classes of equipment design: stand-alone DSLAMs (Digital Subscriber Line Access Multiplexers) and integrated line cards. We examine the environmental and operations issues to determine the relative strengths and weaknesses of these approaches when supporting large-scale service deployments. We also project the relative operational costs between equivalent service deployments. Finally, we conclude by speculating how the industry may change as ADSL moves from small-scale deployments to a ubiquitous mass-market service.

### **Motivations for the Markets**

The telecommunications industry is witnessing the creation of a mass market for computer-based applications and data services. The well publicized demand for Internet access is stimulating demand for high-performance mass-market data services. This growth in end-user demand is being sustained by underlying

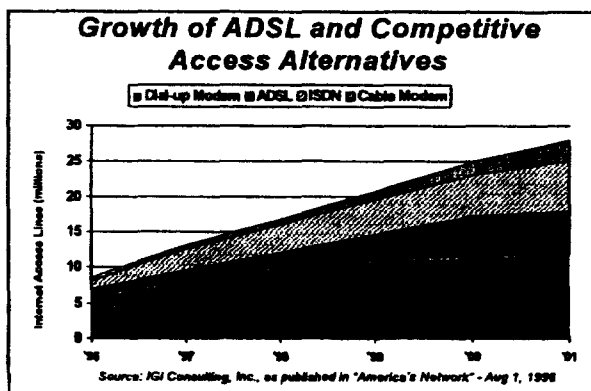
social and technological trends like the integration of work and home and the introduction of the PC into the residence. Today's consumers not only want high speed Internet access to networked services like web browsing, but are also exploring interactive and multimedia applications. Starting with the work-at-home segment, demand for data services will expand to include other segments of the consumer market. This will occur as the computer becomes a fixture in the home and the set of networked applications for consumers grows.

For established carriers, also referred to as Incumbent Local Exchange Carriers (ILECs), this growth in the demand for data services presents an opportunity to increase revenues and margin. It also presents a threat. Over the next several years as cable operators, direct broadcast satellite providers and other access providers enter this market with alternative access vehicles, ILECs will be facing direct competition in their home market for the first time — and for their most valued customers: the on-line and Internet service subscribers. Statistics show that the demand for advanced consumer data services such as Internet access is being generated by a select and profitable group of consumers. According to IDC / Link Research, relative to the average consumer, these consumers have a monthly telephone bill that is 22% higher, have an income that is 42% higher, have more telephone lines and are more likely to have a cellular phone. Interestingly, Internet and on-line subscribers are more likely than average to also subscribe to cable (82% vs. 77%). For new carriers, also referred to as Competitive Local Exchange Carriers (CLECs), this market is the cream

of the crop and will likely be their first targeted market. For Internet Service Providers (ISPs), the ability to provide high-speed access to their service may enable them to begin to provide better performance and new features like "always on" service. These enhancements were not possible when the service was supported over voice-band modems.

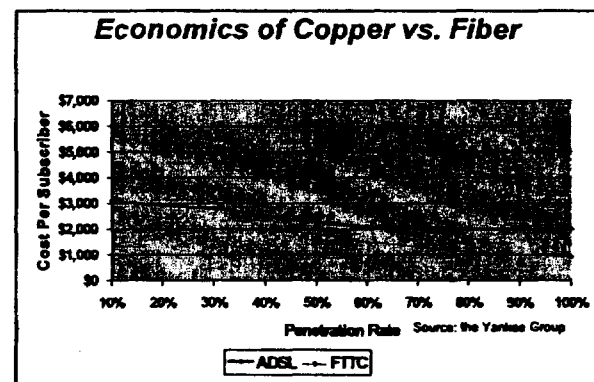
ADSL deployment offers ILECs, CLECs, and ISPs a means to get to market quickly and cost effectively with a high-speed data services solution. ADSL uses existing copper lines, which total more than 140.7 million loops in the U.S. and presently connect more than 500 million subscribers to the telephone network. ADSL is capable of increasing Internet access speeds over these lines by factors of between 25 and 500 compared with conventional dial-up modems. ADSL technology is the result of advances that exploit the relatively high bandwidth of copper loops. It converts existing twisted-pair copper telephone wires into access paths for multimedia and data communications. To transmit this volume of information through twisted copper pairs, ADSL takes advantage of a number of technical advances. These advances include improvements in digital signal processing, transformers, analog filters and analog to digital converters.

Copper-based carriers are being threatened by new, competitive high-speed data services. At the same time ADSL is being rolled out, cable companies, direct broadcast vendors, and wireless industry players are trialing competitive alternatives with technologies such as cable modems, satellite downloads, and Multichannel Multipoint Distribution System. To meet these competitive threats — and protect their customer base — these carriers must get ADSL out quickly.



Despite the existence of credible drivers for the con-

sumer data services wave, future demand is difficult to predict. Established service providers can minimize the risk of serving this market by deploying ADSL. It leverages existing investment in access facilities, hence reducing capital costs. Furthermore, since ADSL is an incrementally deployed technology, carriers can roll out service on a case by case basis as each new subscriber asks for it.



ADSL presents a compelling alternative for carriers that are planning to move to fiber. To provide advanced services, most carriers are planning to deploy fiber closer to the customer. However, wide scale fiber deployment is expensive and can take decades. As shown above, because ADSL can be rolled out on an on-demand basis, it is financially more attractive at low penetration rates versus fiber. Near term, this makes ADSL much more economical. If the operations support infrastructure for ADSL can leverage the efficiency of the existing infrastructure supporting POTS, the point at which fiber deployments are less expensive than copper solutions may shift to even higher, less achievable penetration rates. This may drive ADSL to be the predominant transmission technology well into the third millennium.

## Players in the Service Market

The Telecommunications Act of 1996 (TA'96) mandates the unbundling of the copper plant of the ILECs to foster more competition in the local telecommunications market. The timing of this act has dramatically expanded the number of players and possible approaches in deploying ADSL. Previously, the copper facilities of the ILECs were solely for the use of the ILECs. These resources were seen as either a strategic advantage of the ILECs, or as an encumbrance of the ILECs, depending on what technology was most in

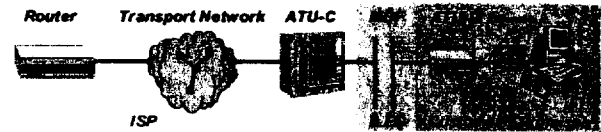
favor in the industry. TA'96 changed all of this. Now the ILEC must make its copper plant available to others operating in its territory, including CLECs and ISPs. The copper is now a shared resource for all to try to use in competition for consumer and business dollars. At the same time, the ILECs are working to define and deploy high-volume, automated support systems capable of supporting the needs of these emerging competitors. The original ILEC plans for supporting unbundled loops did not take into account the special needs of new services over these unbundled loops. The issue of spectrum management in the outside plant has become critical to the successful support of new services on these loops. Prior to unbundled copper plant, careful planning of the deployed technologies ensured spectrum compatibility. New technologies needed to be compatible with currently deployed systems or plans were to decommission old technologies and replace them with more spectrally compatible newer technologies. Now with CLECs and ISPs gaining access to the copper plant and deploying rapidly changing technologies, the ILECs need to develop new systems to support their competitive activities in a manner that preserves the integrity of the common copper asset.

The industry is currently wrestling with the issue of unbundled loops and spectrum management. Although the issue is not yet resolved, several potential technical solutions are known. The industry will need to select an approach so it can be supported in their operations support systems. Thus, the issue of spectrum management should be resolved in the near future. This will allow the infrastructure to support large-scale deployment of ADSL services by ILECs, CLECs, and ISPs alike.

## Approaches to Deploy Services

In a competitive environment, many approaches can be used to provide ADSL-based services. At Bellcore, we have developed a taxonomy of approaches based on the business relationships between the various parties involved in the network providing the ADSL-based service. The taxonomy identifies the possible deployment scenarios, but does not speak directly to what approach is most likely to be successful. The success of each approach is dependent on how well it matches the market needs and how well it plays into the strengths of the parties involved in supporting the service.

### Approach 1: Leased "Dry Copper"



This approach places the entire network providing ADSL service, less copper facilities, with one party — the ISP or CLEC. This allows the ISP or CLEC to quickly turn up the service with the ILEC providing access to its copper infrastructure. The ISP or CLEC brings its data networking knowledge and infrastructure to the table and the ILEC provides access to one of its core skills, outside plant management. This approach is predicated on the ISPs or CLECs using additional copper pairs to support the ADSL-based services. For small-scale deployment, there are probably sufficient spare copper loops to support this service. However, as the deployment grows, the ISP or CLEC will quickly find itself unable to get additional capacity without paying for its construction and waiting for its deployment.

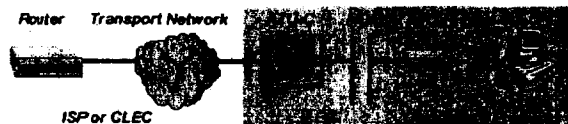
In addition to the problems that may occur as the service grows, other near-term issues limit the success of this approach. First, the ISP or CLEC needs support from the ILEC to pre-qualify customers for ADSL service. This includes the ILEC informing the ISP or CLEC where the customer requesting service is served from (e.g., serving central office or serving remote site) so the ISP or CLEC can determine if and when the service will be available to the customer. In addition, the ISP or CLEC is dependent on the ILEC to provide information about whether a loop can be provisioned to the customer's location that can support ADSL. Finally, the ISP or CLEC is dependent on the ILEC to provide co-location facilities and to perform any MDF (Main Distributing Frame) work needed to complete the provisioning process of the copper pair to the ISP's or CLEC's co-located equipment.

This approach brings with it a need for an entirely new set of skills that an ISP has not fostered up to this point. In general, the ISP line organization is focused on remote management and help desk skills. They are not trained, as part of their ISP experiences, to manage the number of points-of-presence (POPs) needed to support ADSL. The number of POPs needed to provide ADSL service in national coverage for ADSL service would likely exceed 11,000 sites. In contrast, National ISPs currently support about 850 POPs. In

addition, they are not trained to handle issues in physical plant trouble management. With regard to this issue, the CLEC is likely to be better prepared and will likely be able to support the many POPs. Once the copper pair is assigned to the ISP or CLEC, the ILEC does not need to provide any fault management tools. Given that the ADSL equipment is not linked into the trouble testing and tracking system and its processes, they will not be able to use that system for copper fault management and will likely resort to expensive manual processes until an equivalent system can be developed.

This approach creates a service that supports access to a single ISP or CLEC. Any access to a corporate network would likely be through the public Internet. Although secure access over the public Internet is technically feasible, the technology to do this, IPsec, has not yet become sufficiently simple for the average telecommuter to use without substantial effort.

### Approach 2: Leased ADSL Modem Bank



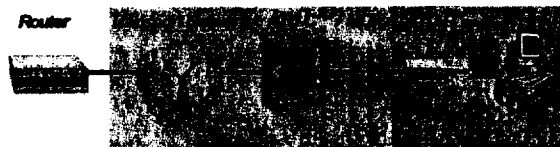
A second approach depends on closer cooperation between the ILEC and the ISP or CLEC to solve many of the issues facing the first approach. The ILEC is now expected to deploy and support the ADSL modems along with managing the copper infrastructure to interconnect these modems with the customer. During customer inquiries, the ILEC can now use its internal support systems to quickly address the question regarding who can be served by ADSL. The ILEC uses its POPs (e.g., central offices, CEVs, and huts) to support the placement of the modem banks and the ISPs or CLECs lease modems based on customer demand and interconnect them with the rest of their network. This allows the ISP or CLEC to leverage its strengths in the deployment of ADSL-based services while using the ILEC to leverage their strengths in the outside plant. The ISP or CLEC is no longer directly physically managing large number of POPs but instead sees the banks of modems as POPs that require remote management from their staff.

The ILEC retains control of the copper infrastructure and can use the same copper pairs for both voice services and ADSL-based services. The common equipment for the support of the ADSL modems can

also be shared between ISPs. In general, this approach is more efficient from a capital utilization standpoint than the previous approach.

However, leasing modems from the ILEC creates a service with similar limitations as the previous approach. The user is tied to using a single service provider. While this provides a fully functional Internet access service, corporate access services are limited to those based on Internet security or having the ISP or CLEC set up a VPN (Virtual Private Network) to support corporate access customers. Since many telecommuters want to be able to switch between corporate access — with all of its security implications and “acceptable use” policies, — and straight Internet access — without any concern for corporate policies, — this service model does not fully satisfy the end-users.

### Approach 3: Regulated Access Service



A third approach continues to add functionality into the ILEC network to meet the end-users' needs. This approach allows the end-user to dynamically switch between service providers, both Internet Service Providers and Corporate Network Access Providers. Using this model, a new ILEC network service emerges as part of a regulated long-term network service. The ISPs and CLECs can now focus on their core business while satisfying the customers with a state-of-the-art access technology. The ILECs can leverage their embedded base to provide a new service necessary for the successful evolution of the telecommunications market into one fundamentally based on Internet technology. The major challenge in this approach is developing a strong service model that meets the various needs of customers, can be quickly deployed, and can be operated economically.

### Approach 4: Unregulated Access Service



Approach 4, which defines a new regulated service, appears to satisfy both the end-user and the service provider in terms of features and functions. However,



it may not be the optimal decision from an ILEC investment standpoint. In the current regulatory environment, the ILEC will need to unbundle the components of that service. When unbundling a service, the current price setting process could minimize the return that the ILEC can make in the capital invested in such a deployment. In addition, the very process of unbundling a service creates new demands on the system design and operation of the network. These additional demands can drive the ILEC into a position that places them at a competitive disadvantage. The end-effect of this regulation is a business with many constraints and risks and limited opportunities for a meaningful return on investment.

An approach that allows the same service model to be deployed without the regulation is expected to perform better in this emerging market. A close approximation to this service model can be created by a CLEC. An interesting spin on this strategy is the creation of a CLEC owned by the parent company of the ILEC. This allows the parent company to invest its capital into the same service as the ILEC service model while operating outside the regulations which might place the ILEC at a strategic disadvantage. Independent of the ownership issue of the deploying CLEC, the service model of the previous approach can be recreated with one exception. The CLEC does not have access to the loop information that is retained by the ILEC. The CLEC, once it can qualify a customer, can provide ADSL services that allow the end-user to dynamically change service providers. It can also reuse the same pair to the customer and then resell unbundled voice services from the ILEC, effectively creating a compelling bundled service — high-speed Internet access and voice services. If the CLEC also provides long-distance services, the service bundle may be even more attractive.

This approach still suffers from some of the industry issues around TA'96. Co-location of equipment must be negotiated on a site-by-site basis. Loop information is not easily accessible to pre-qualify customers for ADSL services. Once these issues are resolved, this approach will create genuine competition in the area of ADSL-based services.

## Infrastructure Challenges

The business relationships discussed above set a framework for the second set of challenges, deploying a new technology into the current environment. The

past 50 years of telecommunication planning have left a substantial legacy of assumptions and constraints that have a direct impact on the successful deployment of ADSL services. Currently, there are approximately 10,000 central offices and 16,500 switching systems in the United States serving 140,700,000 access lines. Of these access lines, 19% are being served by DLC systems. The rate at which new customers are served by DLC is currently very high, with the industry surveys reporting a range between 30% and 50% of new lines served by DLC systems. These DLC systems are deployed in several different configurations: controlled-environment vaults (CEVs), uncontrolled-environment buildings known as huts, and smaller uncontrolled-environment enclosures known as cabinets. These different serving arrangements place very different constraints on ADSL equipment.

The diversity in the outside plant serving arrangements for customers was developed to minimize operations costs for existing services. To this end, this diversity has been a success. However, this diversity has created new challenges for the introduction of new services such as ADSL. When these new serving arrangements were developed, they were designed to be transparent to the customer. This allowed the ILEC to use any serving arrangement that was economical for a specific set of customers. The customer is generally unaware of their serving arrangement. However, as the ILEC plans to deploy a new service, it faces a dilemma. The ILEC can either deploy the new service where it is technically most convenient first, which is generally out of central offices, or it can deploy the new service to an entire geographic area, which makes marketing the service simpler. If an ILEC pursues the former option, they need to develop a strong marketing campaign that targets only those who can get the service and avoids disappointing the consumers who are not yet served. If an ILEC pursues the latter option, they need to develop a business case that can support the larger capital investment. In any case, the long-term success of ADSL will require ubiquitous service.

Therefore, a successful ADSL deployment must be capable of providing coverage for all of these serving arrangements to reach a vast majority of the customers. In contrast to central office-based serving arrangements, use of DLC at remote sites poses a variety of issues for ADSL deployment. These include space, powering, cooling, and transport challenges. The central office environment has been driven by

well-known trends in technology. The continuing miniaturization of electronics has left many central offices with large amounts of floor space. At the same time, the continuing growth in telecommunications and especially in leased lines to support data networks has, in some areas, already consumed the available floor space. In either case, there is sufficient space in the central office environment to support convenient access to the copper facilities. The main distributing frame provides a solid infrastructure for managing any re-arrangements needed to support ADSL access. Central offices are generally equipped to provide ample electrical power and cooling capacity.

In contrast, remote sites are a relatively recent phenomenon. These sites require substantial investment by the carriers, both in terms of invested capital to construct the site and in terms of labor to locate sites and negotiate acceptable terms for these sites. In order to obtain the rights to establish these sites, carriers have designed them to be generally small and unobtrusive. At the same time, these sites have seen unprecedented growth in the number of served customers. The advent of the fax machine, home offices, consumer access to the Internet, and teen lines have all created tremendous growth in the demand for POTS lines. This growth has pushed many remote sites to their design limits and beyond. Equipment manufacturers have worked to meet this growth by developing higher density systems that can be retrofitted into previously deployed systems.

These newer, higher density systems have challenged outside plant engineers to balance the deployment of new capacity with the needs to maintain adequate battery backup. Although the newer systems are generally more efficient in power usage, they tend to draw more power, in total, than the systems they replace. Many remote sites are currently equipped at or above their designed power backup consumption and have no substantial additional power backup to support new systems for new services like ADSL.

All remote sites are engineered with some cooling capacity. In many cases, there is sufficient passive cooling available that this is not a limiting issue for new service deployment. However, in the case of CEVs, the passive cooling capacity is limited and instead active cooling is provided. In these cases, the same trends that have pushed the power backup capacity to its limits have also pushed the active cooling capacity to its limits.

Either copper facilities or fiber facilities may serve remote sites. Since ADSL-based services are bandwidth-intensive, remote sites that are fed by copper facilities may not have sufficient bandwidth available to easily support new ADSL services. Remote sites that are fed by fiber facilities are more likely to have spare transport capacity back to the central office. If not, it is possible to upgrade fiber facilities to higher data rates to provide relief without requiring additional outside plant construction. Upgrading from a SONET OC-3 to a SONET OC-12 or OC-48 is now a common practice.

In addition to the space, powering, cooling, and transport challenges faced when trying to deploy new services at remote sites, the simple task of gaining access to the copper facilities at the remote site poses special challenges. Original engineering guidelines known as the serving area concept placed the remote sites central to several distribution areas. Each distribution area (DA) is designed with a serving area interface (SAI) to support convenient rearrangements of the feeder capacity to meet the varying needs of the customers served by the distribution plant. This SAI is generally not co-located with the remote site. In addition, the feeder plant between the remote site and the SAI is generally sized to meet the expected line card capacity of the digital loop carrier system and then hardwired to the DLC system. No point of rearrangement is generally available in the remote site. This is especially true in the case of CEVs. Thus, there is generally no spare capacity between the SAI and the remote site.

## Equipment Choices

What equipment characteristics are likely to impact the product acceptance for ADSL? One characteristic is the targeted approach for integrating the equipment into the current environment. There are two of these approaches. The earlier ADSL equipment designs were based on the DSLAM model. This model assumes that all the functionality needed to support ADSL services is placed in new equipment with minimal impact on the existing infrastructure. A later ADSL equipment design, which has recently received a lot of press coverage, is based on an integrated line card (ILC) model. This model assumes that the current infrastructure can be enhanced to support ADSL service more cost-effectively than building a new infrastructure.

## **DSLAM Approach**

The DSLAM approach emphasizes the carrier's need to quickly deploy the equipment, regardless of the existing infrastructure. By making very few assumptions about the deployment environment, the DSLAM approach allows any carrier to quickly install the DSLAM equipment into any office and begin offering service. The DSLAM becomes a pre-switch adjunct that the class 5 switch can essentially ignore. The only interaction between the new equipment and the existing equipment occurs when the serving loop is rearranged at the MDF to first connect to the signal splitter. The low-frequency portion of the signal is then rewired to the class 5 switch and the high-frequency portion of the signal is then wired to the DSLAM itself. The ease in which a DSLAM can be deployed is very attractive for early service offerings. Aggressive companies that are working to gain market share and retain current customers can easily benefit from this approach.

## **Equipment Issues for the DSLAM**

The DSLAM approach deploys well in the central office environment. DSLAMs require additional space, power, cooling, and transport capacity. Central offices will generally have sufficient space, power, cooling, and transport capacity to support a number of DSLAMs. Connection to the customer's loop is accomplished with multiple passes across the MDF.

However, deploying a DSLAM into a remote site is not as simple. Remote sites generally do not have spare space, power, cooling, or transport capacity. The deployment of a DSLAM at a remote site may require additional equipment reconfigurations to create this capacity. The DLC system may need to be upgraded to a newer, lower power set of line cards, or a higher density design to free up power and space. If the site is in a CEV and cannot support both new equipment and additional power backup capacity, a new power management process may need to be developed. When the CEV loses commercial power, this process may require the DSLAM systems to shut down to allow the CEV to continue to provide lifeline services without adding additional power capacity.

The space, power, cooling, and transport issues will add cost to the deployment of ADSL services in a remote site and they may require some new construction. This construction may be needed to provide ad-

ditional transport capacity and additional space in areas where the site was already near capacity. These factors may slow the deployment rate of services to the affected sites and may, depending on the cost of these additional activities, make service in some areas prohibitively expensive.

The final equipment issue for DSLAM service at remote sites centers on access to the copper facilities themselves. In many areas in the US, the copper plant at the remote site is pre-wired between the backplane of the DLC system and the SAI. If the DSLAM is to be deployed in the remote site, the DSLAM needs to have access to the copper facilities. To do this, it is conceivable to run new copper facilities to the SAI and re-partition the SAI to allow some posts to support access to the DSLAM. The signal would then travel back to the DSLAM and its signal splitter. Once the signal is split, it would then be rerouted back to the SAI on a second pair and then terminated onto a new pair that would travel back to the DLC system. Many SAI boxes are currently deployed with a planned capacity that was derived from the planned capacity of the remote site. In these cases, this relief plan will not work and more extreme engineering would be needed to provide ADSL service from such sites.

The cost of this work-around is likely to be very high. Add to this the other costs of supporting ADSL services from a DSLAM at a remote site and the installed-first costs for a DSLAM approach in this environment may be too high to ever consider offering ADSL services from a remote site.

## **Operational Issues for the DSLAM**

The simplicity of the DSLAM deployment, which makes the DSLAM approach attractive for early deployments, may be its primary weakness from an operations perspective. When deploying DSLAMs throughout a region, the collection of deployed DSLAMs becomes effectively a new overlay network. The service order flows through the legacy OS environment, and these systems manage the portions of the service that are already reused when supporting ADSL services. For example, the cable pair assignment and the port assignment are handled in the legacy systems. Since the DSLAM's element management system (EMS) is not integrated into the current service order process flows, the service order drops out of the system when it needs to provision the DSLAM. The

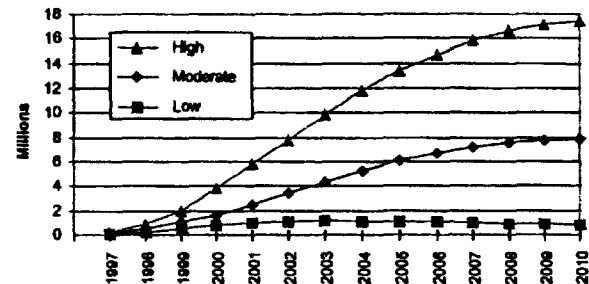
service order then requires manual intervention before the ADSL service order can complete. The remainder of the service order processing is performed manually with the EMS and any additional systems needed to complete the provisioning beyond the DSLAM. The bulk of the manual effort involves the provisioning and assignment of a Permanent Virtual Connection (PVC) between the customer and the service provider.

In addition to the provisioning costs, the overall operations costs are also affected by the efficiency of the service assurance processes. The following is an example of the reasoning used in determining the efficiency of this process.

*Any service assurance call begins with simple fault isolation mechanisms. One of the first tools generally used after interviewing the customer is a metallic loop test (MLT). However, the DSLAM does not support any MLT activities. Instead, the craft personnel could use the class 5 switch, which does support MLT testing. This would require access to the customer's telephone number. Depending on the service record approach taken, the customer's telephone number may not be easily determined once a work order has been issued. Even if the telephone number was available, the MLT system could test the low-frequency connectivity. If this fails, then the craft can proceed with their normal process. However, if there is connectivity for low-frequency service, MLT cannot provide any definitive feedback on the ability of the loop to support ADSL. It cannot detect if the customer has been re-arranged onto a facility with a load coil or if a T1 circuit was recently routed in the same binder group—two situations that make it impossible to support ADSL service on the current loop.*

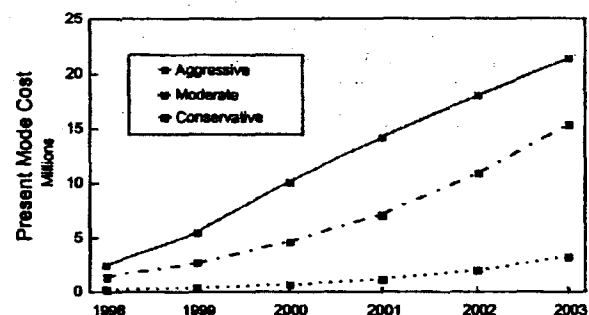
In order to compute the operations costs of a DSLAM deployment, Bellcore has projected three different market growth rates, as depicted in the following figure. These market growth rates are used to develop upper and lower bounds on the potential customers of operating a network based on DSLAM technology.

Bellcore Estimate of Households and Small Businesses Using ADSL Across the United States



Using historical costs for current operations activities, Bellcore has developed a set of operations costs for the activities needed to support a network based on DSLAMs. This includes the operations costs for network creation, service provisioning, and service assurance for the copper plant, the DSLAM, and the transport network. Combining these costs with various rates for these operations activities and the overall number of customers leads to an expected operations cost for this network. These costs are shown in the following figure.

PVC Operating Costs  
Baseline Results for Single Vendor



### Integrated Line Card (ILC) Approach

The integrated line card approach emphasizes the efficiency of a solution that can be installed in existing equipment and provisioned using existing processes. It leverages the notion that the existing infrastructure can be modified to support ADSL line cards. For example, Nortel has announced a product called a *1 Meg modem* that can provide both voice and data services from a single line card. This requires an upgraded backplane in the supporting shelf to aggregate the traffic between the various line cards and the interface to the transport network, but the rest of the infrastructure remains essentially unchanged. Integrated line cards are also planned for the Nortel AccessNode. Both Lu-

cent and DSC have also announced similar plans, with Lucent announcing integrated line cards and backplane upgrades for their 5ESS and SLC series products and DSC announcing integrated line cards and backplane upgrades for their Litespan product.

In developing an operations solution for integrated line cards, one of the goals is to re-use current process flows. The ADSL service on integrated line card equipment can be modeled as a new Custom Calling Feature (also known as a CLASS service). CLASS services are provided on top of existing voice service interfaces (e.g., POTS) and the flows to support this type of service are robust. Normal service ordering, disconnect, and change orders are all current process flows. The service flow for CLASS features already supports the notion that a specific CLASS feature may need feature-specific data to complete an order. Thus, the process flows for these features support the handling of feature-specific data from the service order processor, through the OS systems, to the switch that will provide the service. This will allow the service provider to write service orders which can contain any information needed to flow through the existing infrastructure and processes and be delivered, ultimately, to the ILC management system. This allows an ILC approach to be deployed and immediately have a relatively robust operations infrastructure in place.

### Equipment Issues for the ILC

Deployment of the ILC approach is limited by the availability of the hosting equipment. The targeted offices need to have appropriate equipment. Most carriers have one or two preferred vendors. If an approved ILC system is available from these vendors, the deployment of ADSL from these systems should be very easy. A shelf of the system is cleared of customers by transferring their service to another shelf. Once the shelf is clear, it is upgraded to support the ILCs. The shelf is then populated with ILCs. The provisioning systems are updated to reflect the new features of these line cards and service orders will then begin to assign these cards as needed.

If these offices are not equipped with a system that has an approved ILC system, it is possible to deploy a new system from an approved ILC vendor to support the new services. In a central office environment, it is most feasible to deploy a DLC system into the office and provide ADSL service and POTS service from that platform. Since space, power, and transport ca-

capacity is generally available, this is a feasible approach. The cost effectiveness of this needs to be studied. At remote sites that are served by a DLC system that does not have an approved ILC system, the ILC approach does not have substantial advantages over the DSLAM approach.

A major advantage of the ILC approach is its convenient access to the copper plant. With an integrated card, a service order to provide ADSL service is translated into a request to change the wiring of a customer to serve them from a switch port capable of supporting the ADSL service. Once the customer's port is rearranged, the service order is translated into a request to move the customer's POTS service configuration from the old switch port to the new switch port. At the central office, the customer's line has a single appearance on the MDF and is connected to one piece of equipment in the central office. Although this is superior to the DSLAM approach, which requires two passes on the MDF, the resulting congestion at the MDF is not likely to substantially impact the viability of the ADSL service. However, unlike the DSLAM approach, the impact of the ILC at a remote site is minimal. As previously discussed, the outside plant design plans do not generally co-locate the SAI and the remote equipment. This separation of equipment makes wiring a DSLAM into the circuit between the SAI and the DLC system very difficult. The ILC approach does not suffer from this. Since the line card provides both POTS service and ADSL service, a single change at the SAI allows the customer to be conveniently moved from a POTS line card to an integrated line card and provided ADSL services.

The ILC approach does have its limits. The line cards to support ADSL services draw more power and support fewer customers than a POTS-only line card could support in the same space. Consequently, any system that has ILCs deployed will lose effective POTS capacity to gain ADSL capacity. In offices and remote sites that are nearing capacity, this may become an issue as the market penetration of ADSL increases.

### Operational Issues for the ILC

The ILC approach requires an existing infrastructure to be in place before service can be offered. In most cases, this infrastructure is already available. In areas where it is not available, new equipment can be deployed or these offices can be scheduled for future

phases of a service launch. This need for infrastructure, which can delay initial deployments, bears tremendous benefits in the operating cost of this network.

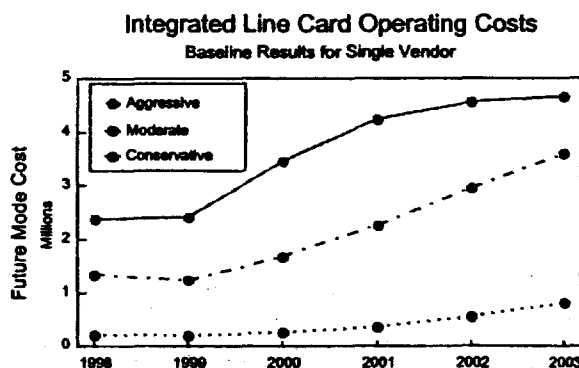
Early operations costs are driven primarily by the cost of learning new processes and systems. Errors in executing the new business process are translated into additional operating costs generated by additional service calls. In addition, these errors can adversely affect the market perception of the carrier's brand and lead to lost potential revenues for this service and other related services. The ILC approach minimizes the risk of these types of errors. It leverages the current processes and systems and allows the craft personnel to learn a minimum of new activities needed to enable ADSL services. The learning curves for an enhancement to an existing product are much less dramatic and translate into immediate savings in the operations costs of the new service.

The ILC approach immediately supports a strong level of flow-through provisioning. Bellcore operations support systems can provide flow-through of the line card provisioning with system enhancements and without the need to develop entire new systems. This translates into faster time-to-market and lower support systems cost when compared to the DSLAM approach. The new service flows through the same process but requires new line cards. The service provisioning process has no processes that the craft personnel need to learn. In effect, the ILC is a new line card for the existing services and one new service.

The service assurance processes are also very familiar to the craft personnel. The placement of the line card into existing equipment that supports mechanized loop testing (MLT) allows the craft to leverage their current process for fault isolation. The process begins with an interview of the customer and service identification. Since the ILC uses the telephone number for the service record identifier, the customer simply needs to know their telephone number to begin the process. During the interview process, an MLT test can be performed. This can quickly identify if the problem is with the continuity of the cable plant. Of course, these tests are not currently sophisticated enough to identify all troubles with ADSL services, but they do provide a strong infrastructure to build the needed additional expertise required to make ADSL service assurance cost effective.

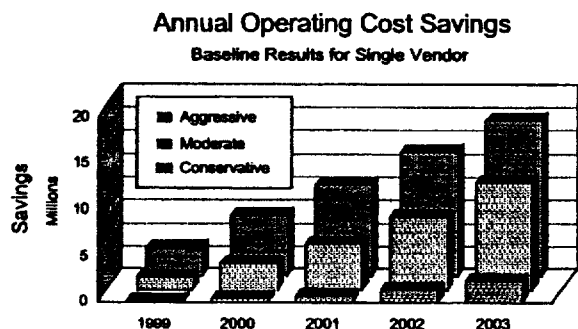
Bellcore has estimated the operating costs for an inte-

grated line card approach that includes the provisioning of the backbone network. Using the same costs developed for the DSLAM approach, Bellcore has developed a set of operations costs for the activities needed to support a network based on ILCs. This includes the operations costs for the same activities that were modeled for the DSLAM approach. Combining these costs with various rates for these operations activities and the overall number of customers leads to an expected operations cost for this network, shown in the following figure.



In order to compare the cost differences between the DSLAM approach and the ILC approach, we assumed that the market penetration for these two deployment approaches is identical. This assumption may need to be challenged. The DSLAM approach can be deployed in more locations without concern for the available serving equipment. This may allow it to reach more customers more quickly. At the same time, the ability to deploy the ILC approach into areas where the customers are served by DLC systems may allow for a wider deployment of ADSL services. The perception of a ubiquitous service as a strong influence on a customer's willingness to pursue a new service. In addition, the perception of ubiquity will also create additional incentive for ISPs to launch ADSL-based access to their services.

Without attempting to project the impact these issues may have on the ADSL market penetration, a straight comparison of these approaches shows an operational savings for the ILC approach, as shown in the following figure.



## Implications on Market Velocity

As the previous discussions indicate, the ADSL market is diverging in many areas. There are many approaches to deploying ADSL, ranging from ISPs deploying ADSL modems on "dry copper" to ILECs developing a new major service offering. Each deployment of ADSL has brought a new service model to the market. The service models affect all aspects of the ADSL market, including the end-users, manufacturers, and service providers.

There are two approaches that appear to have sustainable business advantages that meet the end-user service needs: a regulated data service and an unregulated data service. The regulated data service currently has the advantage with better access to information on the infrastructure. The unregulated data service may offer a more compelling investment opportunity if the challenges of integrating information from the regulated carrier and the unregulated carrier can be solved competitively.

The advent of the integrated line card approach to supporting ADSL services has added new options into the market. The idea of an integrated line card solves many of the outside plant issues that are delaying ADSL service from being deployed in remote sites. At the same time, the carrier is dependent on the embedded vendor to develop a cost-effective ILC solution. This approach may provide additional economical advantages for carriers deploying a regulated data service. An unregulated carrier deploying an ADSL-based data service will rely on DSLAM technology.

Given the challenges of deploying DSLAMs in remote sites and the current regulatory rulings regarding collocation of equipment at remote sites, it appears that there are still challenges that need to be solved before this approach can successfully compete with a regulated data service approach. Until that time, the industry will likely see the current small-scale trials of DSLAM-based ADSL service shift to ILC approaches to economically support large-scale, ubiquitous ADSL service deployments.

## Acknowledgments

The main objective of this paper was to stimulate industry debate and discussion on the solutions for the successful deployment of ADSL-based services. The views expressed here are those of the authors, and do not represent the views of Bellcore. The authors gratefully acknowledge discussion with many industry members including members of the ITESF, and the following Bellcore subject matter experts: Jeff Goldthorp, Chad Herbert, Ed Pinnes, Grant Lenahan, John Wojewoda, Jerry Farro, Mary Lau, and Art Daughtry.

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Mr. Charles Woloszynski is the Director of ADSL Solutions, working in Bellcore's Broadband Access Design and Engineering Practice. His group performs research into service architectures and deployment challenges for high-speed data network access, including ADSL technology. They provide system engineering, economic modeling, deployment planning, and equipment testing for carriers. In addition, his group also supports strategic planning, systems engineering, and equipment testing for equipment manufacturers.

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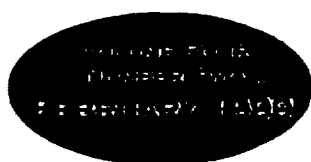
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# THE TeleChoice REPORT ON



# xDSL

ANALYSIS OF LOCAL LOOP TECHNOLOGY AND SERVICES

THE TELECHOICE REPORT ON xDSL

## xDSLEADERS: AN INTERVIEW WITH PRISM

**P**rim (formerly Transwire Communications) is a "next-generation communications company" that bills itself as a single solution company for high-speed data, Internet, video, and voice services. TeleChoice spoke with Dennis Kruse, Chief Marketing Officer.

TC: Please provide an overview of the Prism strategy.

Prism: Prism was formed in June of 1997 to take full advantage of the 1996 Telecom Reform Act. We were formed primarily to provide high-speed data services and advanced communications services to medium and small businesses in Manhattan. We extended that reach with a sure relationship with Nortel. We awarded a contract to Nortel in June of 1998 for \$330 million dollars worth of equipment in order to build out a facilities-based network that provides a high-speed, digital capability for the exchange of advanced voice, data, and video services. Our territory is from Maine through North Carolina, east of the Appalachians.

Right now there is a screaming need amongst work-at-home users, power users, and small and medium businesses for affordable, high-speed data access. These are people who traditionally used dial-up services, ISDN, or in some instances pay a fairly hefty amount for a fractional T1. We saw an opportunity in the marketplace where we could provide these services at a higher speed and a lower cost through standard copper telephone wires. This is the Nortel 1-Meg modem service that is embedded in our network infrastructure.

Initially, our strategy is to mass market our product to these groups. Let me just step back and talk a little bit about how we got here. We define our core business prospects as businesses under 200 employees—and really the majority of those are businesses under 100 employees who have a need for high-speed data access in their day-to-day business operations. We have led a tremendous number of focus groups with these people in order to determine their real needs. We found that for most of these businesses, the decisions for telephony and data services are made by the sole propri-

etor, the individual who runs the business, the executive secretary, or someone in the office who happens to have enough computer skills and knowledge to get the assignment. But that decision is on top of a number of other responsibilities that they already have. So consequently, they are not that technologically knowledgeable as to what's new in the marketplace. They really don't want to be. We have found from research that about 56% of these people are looking for a single source provider for their telephony products. They are really looking for a company that can provide them with solutions for those communications, without taking up a lot of their time worrying about the latest technology.

So, we provide the technological expertise for these people. We try to be non-technical in our approach to them because we know number one, they may not possess a high level of technical knowledge; and number two, they really may not want to know the ins and outs of the business. It's difficult enough to be someone that is trying to run a business, let alone having to keep up with the technology your business must rely on every day just to survive.

So what we have done with this information is understand how we need to communicate with them given their dilemma.

The assignments I gave our advertising agency were to come up with a name for the product that was non-technical and a marketing strategy that would get the information to the consumer, so they could make an informed decision without having to know how the technical aspects of this product work.

After a tremendous amount of research we came up with a name that will introduce the product in Manhattan on January 31<sup>st</sup>.

The product is RED. We chose the name because it's non-technical and highly memorable. In further research testing we did with the name RED, we found that the recall for that name is very high even if you

don't explain to people what the product represents. We went to 250 people and exposed 13 names to them, one of which was RED. Two weeks later we went back to the same 250 people and said, two weeks ago we showed you 13 names. Do you remember any of them? Sixty-one percent (61%) of them remembered RED. So unaided recall for a name that gets you a 61% recall gets you up there equivalent to major national brands. That's before we spent any money at all talking about what RED is.

So we accomplished two things really; we discovered a name that was non-technical with a high level of recall, which will make our advertising and consumer communications fairly efficient in terms of communicating RED the name and RED the product. We also wanted a name flexible enough to be segmented with the other product lines developed.

When we launch the product January 31<sup>st</sup>, we will launch it in all the major media—in television, radio, newspaper, magazine, outdoor, and direct mail—in the New York metro area. We have four spots inside the Superbowl that will kick off the campaign. So if you really had to look at our communication strategy and market strategy to our potential customers, it's using mass media to drive inbound telephone calls and also to create sales leads for our direct marketing staff. We will have a sales team on the street that will call on customers as well. We are really covering all the bases.

We are developing a brand that instills in the customer's mind knowledge and familiarity of who we are. We will communicate that very effectively through a broad range of media in order to create interest and knowledge about what that brand represents to instill consumer confidence. We are using all of the sales channels available to us in order to reach our potential customers. So we use mass market to drive inbound tele-sales. We use outbound telemarketing to prospects that we develop through our database development efforts. We use direct sales; our direct sales staff is in house. We also developed VAR relationships, and they will resell our product for us. But it will all be off of the premise RED and the topspin that we create through the media in building the brand.

## SAMPLE OF PRISM'S RED DSL SERVICE AD

**RED MEANS GO**

17 times faster than 56K

8 times faster than ISDN

www.red-2000.net

1-888-red-2000

TC: Can you share with me the slogan or any of the ad copy?

Prism: The commercial that we are breaking with puts you inside of a very fast automobile. When you look through the windscreen of the automobile you are in the driver's perspective. You see what would normally be a speedometer, but instead of a speedometer you see an indicator of how fast you would be accessing the Internet. So the speed indicators on the speedometer give the frame of reference for what RED is all about. Within the ads, there are three messages: first, that DSL is 17 times faster than analog modems; second, that DSL is eight times faster than ISDN; and third, that standard telephone wiring is utilized. (See the sample RED print ad).

TC: Prism's strategy for deployment of a switching infrastructure to support voice is different from many other CLECs with a DSL strategy. Can you explain why you've decided that providing a true voice service is a requirement in your market niche?

Prism: Prism's strategic position is as an advanced communications carrier that will supply turnkey solutions for our customers' communication needs. In order to fulfill that strategy, both a voice and data service solution and facilities are required.

TC: What are the key geographic markets for Prism, and what markets are planned for the future?

PRISM (CONTINUED ON NEXT PAGE)

**Prism:** Over the next 18 months we will be deploying nationally in over 25 major markets in the US. The initial markets include Manhattan and all the other major cities along the eastern seaboard. During the first half of 1999, we will enter Boston; Philadelphia; Washington, DC; Baltimore and down into Research Triangle; Nortel's home base; and in the balance of 1999 into Atlanta, Dallas, and Chicago.

**TC:** How many DSL customers do you have currently? What is projected for 1999?

**Prism:** We currently have 200 customers. We're projecting 20,000 customers through 1999, and that includes the New York Metro area and major cities in the northeastern corridor.

**TC:** What are your DSL price points?

**Prism:** We have two packages. The first is RED Single, which is geared toward a single line user. The rate is \$199 per month, and it includes the DSL modem, IP address, email, and the Internet gateway plus ISP services. The service is 24x7 data and Internet connectivity. The second package is RED Network and it is geared towards multiple access line customers. For this, the customer must have a router, so we include it in the package. The rate is \$399 per month and it includes the router, 1-meg modem, everything provided in RED Single, plus up to six email boxes and IP addresses.

**TC:** What are Prism's plans to market to consumers?

**Prism:** For consumer markets, we believe our key segments will be work-at-home environments and power users. For work-at-home, we include customers such as the "architect Mom," who does her job from the home. The power users are those early adopters who have multiple requirements for high-speed connections. They might utilize the connections for online gaming, for example. We have actually just started offering a consumer product, RED Res, at \$79 per month that will allow data delivery at a maximum speed of 640Kbps downstream and 120Kbps upstream - scaled down from our RED Single speeds of up to 1-meg. We are also offering RED dial-up services for as little as \$9.95 per month.

**TC:** What differentiates Prism from its competitors?

**Prism:** Our customer relationship strategy is the major difference. We build one-to-one relationships with our customers and offer credible, affordable business solutions to meet their needs. Prism differentiates itself

from its competitors in three vital areas that are of supreme importance to small business and power users: speed, service, and simplicity. By integrating voice and data network services and products, Prism is positioned to offer the small office and home office user a single, comprehensive solution for all of their advanced communications needs.

**TC:** Please describe Prism's strategy for becoming an ISP or partnering with ISPs to provide an end-to-end DSL solution.

**Prism:** We use CerfNet for the backbone to the Internet, as well as VARs. We are an advanced communications company that will provide Internet, telephony, data, and video services. We will also offer a retail "off-the-shelf" version of RED in a box.

**TC:** Please describe Prism's plan to incorporate value-added services into its product portfolio (e.g., video conferencing and data recovery)?

**Prism:** Our first step after signing customers to our service will be to migrate them to voice with local and long distance services. This will take place beginning in 1Q99. Second we will leverage our relationship with Comdisco to offer the customer data recovery services. (Comdisco is both a strategic partner and an equity holder in Prism). Then we will offer video conferencing and streaming technologies. The fourth step will be to offer thin client applications. These last three steps will take place throughout the 2<sup>nd</sup>, 3<sup>rd</sup>, and 4<sup>th</sup> quarters of 1999.

**TC:** What installation process is Prism using? What have you learned from the installations you have completed, and what are the major issues needing to be resolved?

**Prism:** The process includes two major steps: ordering the service from Bell Atlantic and providing copper access. We remain in constant contact with our customers to provide ongoing status. The entire process takes 10 days to three weeks. We expect the amount of required time will shrink as more collocations are set up. The biggest issue is the interface with the RBOC.

**TC:** How has the relationship with Bell Atlantic gone?

**Prism:** Fine, but the test will be after the mass advertising is launched. Bell Atlantic has been fine to work with during these early stages, but right now they don't pay much attention to us because we're small compared to them. Once we really start competing, we expect the relationship to adjust. We'll see how it goes.

**TC: Does Prism have SLAs?**

**Prism:** Yes, we do. We offer our customers a full 30-day money back guarantee.

**TC:** You previously shared with TeleChoice that you had established a Market Advisory Board made up of customers to learn about customer needs. Are there any learnings you can share?

**Prism:** The first meeting is scheduled for late February, so we don't yet have an update.

**TC:** What do you see as the three major issues impacting the growth of the DSL industry today that need to be resolved? What solutions are needed?

**Prism:** The first major issue is the long lead-time required for collocation due to regulatory issues. Ultimately, the focus here should be on what is good for the American people, not necessarily what will benefit the incumbent. Prism has deployed and will continue to deploy a network that can meet the future advanced communications needs of our present and future customers. We will work aggressively, yet cooperatively in order to make that vision a reality.

The second is that there is currently no standard for DSL. There is an ongoing debate concerning the G.lite standard. While we believe that this is important, we don't believe people should have to wait if the technol-

ogy is available today. We are utilizing Nortel's technology, which will conform to whatever standards may ultimately be agreed upon.

Third is that the industry as a whole is communicating a message to the market that is too technical. Customers need to understand the benefit of a service before they will be willing to try it. Also, it is important that customers get the service they are promised and that they expect. Service is not something you can talk about; you just need to do it better, every single day.

**TC:** Is there anything else you would like to share with our readers?

RED is specifically designed for small business and power users. It offers combined voice, lightening fast Internet, and data services over a single telephone line. RED leverages Nortel's digital modem that is 17 times faster than the best analog modems, eight times faster than ISDN and uses the same copper phone lines that are in every home and office. As RED rapidly expands down the eastern seaboard, Prism will be defining NextNet that uses voice and data into a stream of always-connected services ranging from high quality video, audio, and video conferencing to interactive voice response and corporate Intranet and Extranet services. RED is also enabling Prism Communications to deliver traditional, big business services to small businesses. ▲

## WEAVING THE WEB

Thanks to all who have registered on our new xDSL forum. For those of you who have not yet visited, go there fast! You will see why [www.xdslforum.com](http://www.xdslforum.com) is the

premier clearinghouse for xDSL issues and information.

Rotating banner ads are available on our Web site at <http://www.xdslforum.com>

Banners are linked to the site of your choice.

For details, please call Harriet Linskey at 1-607-587-7633.



## COMING SOON IN THE TELECHOICE REPORT ON XDSL

▲ A Closer Look at Cable Modems

▲ End User Report—A Cable Modem Installation Story

▲ ISDN vs. DSL

## RED MEANS GO

When the download bar isn't moving, neither are you. **RED** levels the Internet playing ground, giving small businesses the same sophisticated communications services that large corporations take for granted. **RED** uses digital modems—breakthrough technology that eliminates the bottlenecks commonly found in the copper loops in every home and office. **RED** delivers lightning-fast data services over a single phone line, offering a unique, splitterless DSL service to New York and other regions that overcomes many of the drawbacks associated with traditional DSL services (ADSL, etc.).

Prism is building an advanced digital ATM network that mirrors Bell Atlantic at every stop in Manhattan and has as much switching power. Once the modem is connected, Prism makes a simple line card change in its switching facilities and a lone telecommuter or entire office is connected with high-speed Internet access. **RED** is supported by a team of experts committed to resolving problems on the first call and without a hassle.

Customers may choose from three different always-on, high-speed data connectivity offerings:

- **RED HomeWork<sup>SM</sup>**, a 640 Kbps downstream service intended for telecommuters and power users. One static IP address and one e-mail account are included. **RED Res** pricing starts at \$79.95 a month with a one-year contract or \$99.95 a month with no contract.
- **RED PowerWork<sup>SM</sup>**, up to 1 Mbps downstream service tailored toward home office users and telecommuters that need even more bandwidth for large file-transfers, graphics and other needs. This service also includes one static IP address and one e-mail account. **RED Single** pricing starts at \$129.95 a month with a two-year contract, \$149.95 a month with a one-year contract and \$199.95 a month with no contract.
- **RED Network<sup>SM</sup>**, up to 1.0 Mbps downstream service designed to provide Internet access to many employees working in small businesses or remote offices. Six static IP addresses and six e-mail accounts are provided. **RED Network** pricing starts at \$299.95 a month with a two-year contract, \$349.95 a month with a one-year contract and \$399.95 a month with no contract.

## A WELL-CONNECTED COMPANY

Prism is a wholly-owned subsidiary of Comdisco<sup>TM</sup> (NYSE: CDO), the world's largest provider of leasing, asset management and data recovery services. In July, 1998 Prism awarded Nortel Networks® (NYSE: NT) a \$330 million, three-year contract for DMS SuperNode central office switches, Magellan Passport ATM switches and digital modem equipment.

-more-

## **WELCOME TO THE ALWAYS-CONNECTED WORLD**

**RED** combines yesterday's wiring with today's hottest technology to make advanced communications services as ubiquitous and as easy to use as the common telephone. It's one of the innovators paving the way for fast, easy access to every home and office in the country. Prism is rapidly expanding its service nationwide, defining the "NextNet" that fuses voice and data into a stream of new always-connected services—ranging from high-quality video and audio, video conferencing and interactive voice response to corporate intranets and extranet services.

So welcome to the always-connected world, where anyone can instantly download video clips from last night's news or zoom in to check on their children in school or daycare through a direct video feed. You'll soon be running all your software and services online—getting instant updates to your word processor and browser each time you connect. Whether you're ready or not, fast, simple bandwidth is here and it's available through your phone lines.

**RED** means go—so try and keep up.

Contact: *Debra Niewald at Prism Communication Services, Inc.*  
917-305-2133; [dniewald@prismcsi.net](mailto:dniewald@prismcsi.net)

**Forbes**  
Digital Tool

**STARTUPS**

**Growing**

## Red-hot Prism

By Om Malik

Can a small startup company get attention and attract new customers? Sure it can, as long as it can afford a multimillion dollar advertising campaign and has the clout to get prime spots on the Super Bowl telecast.

That's precisely what Prism Communications, a New York-based Competitive Local Exchange Carrier (CLEC) did when it launched its "Red" high-speed Internet access service. The two-year-old company had 11 spots on Super Bowl day--with one simple message, "17 times faster than a 56K modem" against a bloodred backdrop.

The campaign did the trick, and even before the Denver Broncos were done making a joke of the Atlanta Falcons, Prism's toll-free number was clogged and its web site was busier than the Long Island Expressway during rush hour. Since then the company has literally painted the Big Apple red with its ads in the major daily newspapers and on billboards and bus shelter displays.

The 80-person startup, which is likely to be acquired by Comdisco (CDO), is headed by former AT&T executive Terence Peck, who is spending \$10 million to get the broadband message out to New Yorkers. Based in the heart of Silicon Alley, the company is offering 640 kbps for about \$80 dollars a month for consumers and about 1 mbps for \$350 a month for small and medium-size businesses.

**Fast, affordable high-speed Internet access minus the techno geek speak and complications.**

The technology behind the service is Northern Telecom's version of digital subscriber line (DSL) technology, which allows high-speed data communication over plain old copper wires. Once you sign up for the Red service, Prism installs a new phone line in your house (or business) at a cost of \$299. The modem is included as part of the overall package.

"We are building a brand," says Dennis A. Kruse, chief marketing officer of the company, justifying the big-ticket marketing campaign. Red service is targeting the small and medium-size businesses with its marketing mantra: fast, affordable high-speed Internet access minus the techno geek speak and complications. "The Red advertising campaign is designed precisely to highlight the ease of use," he adds.

Kruse points out that while other CLECs are busy selling wholesale access to large corporate customers and Internet service providers, Prism wants to have a "relationship with the customer." Prism will need that relationship because sometime this summer, local Baby Bell, Bell Atlantic (BEL) is going to start selling its version of DSL high-speed access in partnership with America Online (AOL). Not to mention the fact that MCI WorldCom (WCOM) and Sprint (FON) are going after the same small- to medium-size-business market.



**For Immediate Release**

For more information:  
Debra Niewald  
Prism Communication Services, Inc.  
(212) 366-5545  
[dniewald@prismcommunication.net](mailto:dniewald@prismcommunication.net)

**PRISM DELIVERS RED-HOT, HIGH-SPEED CONNECTIVITY TO SMALL BUSINESSES**

*Innovative New RED Service Delivers Lightning-Fast, Always-on Access at 1 Mbps, Enabling Small Businesses and Telecommuters to Use the Internet Easily and Productively*

**NEW YORK—February 1, 1999**—Prism Communication Services, Inc., an advanced telecommunications company formerly known as Transwire Communications, today announced a high-speed service that allows users to download data at speeds normally reserved for big corporate customers. Simply called “RED<sup>SM</sup>,” this new service is specifically designed for small businesses, home offices, telecommuters and “power” users. RED offers always-on, lightning-fast Internet access over existing telephone lines, radically transforming the way users connect and communicate, without rewiring their offices.

RED levels the Internet playing ground, giving small businesses the same sophisticated communications services that large corporations take for granted. At the heart of this new and powerful service is innovative digital subscriber line (DSL) technology. Using digital modems and an advanced Nortel<sup>TM</sup> network, RED customers can download data at speeds of up to 1 Megabits per second (Mbps)—17 times faster than the fastest analog modem (56K) and roughly eight times faster than dual-channel ISDN without any per-minute charges.

“Small businesses need high-speed Internet access, but the T1 and ISDN services available today by traditional carriers are just too complicated and expensive. RED gives smaller businesses the speed and simplicity they’re looking for at a price they can afford,” said Terry Peck, founder and chief executive officer of Prism. “RED transforms the way small businesses communicate, empowering them to attract new customers, compete effectively in the digital marketplace and collaborate more effectively with partners. **RED MEANS GO** — go get on the Internet quickly, work more productively and go home earlier.”

—more—



But bandwidth-hungry New Yorkers are not waiting; about 1,000 have already signed up for the Red service, which is based on a 1-Meg modem made by Canadian networking equipment maker, Northern Telecom (NT). That is 5% of the 20,000 target the company has set itself over next 12 months. The \$10 million marketing budget translates into about \$500 to be spent on every customer.

Since the company owns much of its network infrastructure (it spans from Maine to North Carolina), Prism expects to break even by the end of 1999, and make money within a year, thanks to the fact that it will be launching the service in six more East Coast cities, including Philadelphia and Washington, D.C. Also in the cards is a 4-megabytes-per-second Ether Loop package--basically a high-speed access service--for small and medium-size businesses. Twelve-month revenue target: \$50 million.

The bold marketing campaign and the prospect of high-speed Internet access has many wondering about the company. Fifty-year-old Terrence Peck, after having worked at a series of phone companies including AT&T (T) and MCI, started Prism in 1997. At the time, the budding CLEC was called Transwire Communications.

With some \$20 million in venture capital funding from firms such as Vision Capital and Catamount Capital, the company set about building its own network and other operations--but remained low key and below the press radar. In November of 1997, the company tied up with Northern Telecom to build out a DSL infrastructure in Manhattan. "Press releases do not mean anything unless you have a service, so we stayed quiet until we had an actual service to offer," says Kruse.

The company has its work cut out for it because the broadband wars are just beginning. But in round one, Prism has been red-hot.

In addition to providing Internet access at breath-taking speeds, **RED** service offers complete e-mail and web-hosting services, making it unnecessary for customers to continue using their current Internet Service Provider (ISP). And because **RED** is provided on a 24x7, “always on” basis, customers no longer have to go through the frustrating and time-consuming “dial-up” process. With **RED**, customers will never hear a busy signal when they want to go online, because they are online all the time and slow download waiting periods are eliminated. After installation of a new phone line, **RED** users simply plug the 1-Meg digital modem, manufactured by Nortel Networks™, into their telephone jack themselves, and they’re ready to go. No service call is required.

### **Prism Tailors “Big Business Services” for Small Businesses**

Since small businesses with smaller connectivity needs do not get the attention they deserve from larger carriers, Prism is dedicated to providing “big business” customer service to the small businesses that use **RED**. Prism provides resolution for all customer inquiries within 24 hours and 24x7 support. To further simplify a traditionally complicated business, monthly charges for Internet access and future voice, video and extranet services will be consolidated onto a single, easy-to-understand bill.

Ron Ben-Israel Cakes ([weddingcakes.com](http://weddingcakes.com)) is just one of many small businesses that was looking for ways to improve the way its voice and data communications were handled. Ron Ben-Israel, a celebrated designer of wedding cakes who relies on the Internet to do business, is one of more than 200 Prism customers who used **RED** during recent beta testing. “I used to spend at least an hour a day working online with my old modem, and most of that time was wasted on waiting for files to download,” commented Ben-Israel. “With **RED**, what used to take hours now takes minutes. I have more time to take care of my customers and that has an impact on the bottom line.”

In the coming months, Prism will also offer a new range of services that, until now, were not available to smaller businesses. Through its partnership with Comdisco, Prism will be able to offer small businesses the most advanced communications services, including equipment leasing and nationwide locations for Internet and extranet hosting. Additional Comdisco offerings, such as automatic storage products and asset management programs, will also be available to Prism customers.

“Prism Communication Services is approaching the small business market with a true marketing focus for their products,” said Claudia Bacco, a senior DSL analyst with TeleChoice, Inc. “By focusing on understanding their target market and providing a solution tailored to target customers’ needs, Prism is differentiating themselves.”

### **Pricing and Availability**

**RED** is available immediately in New York City directly from Prism, or at select retail outlets, partners, integrators and agents, including: DataVision, J&R Computer, InterSolutions, Manchester Equipment, MetaNet, RCS/Unplug-It, Mien Information Solutions, PC Mania, Simply TV and Skyline Connections.

Customers may choose from three different always-on, high-speed data connectivity offerings:

- **RED HomeWork<sup>SM</sup>**, a 640 Kbps service intended for telecommuters and power users. One static IP address and one e-mail account are included. **RED HomeWork** pricing starts at \$79.95 a month with a one-year contract or \$99.95 a month with no contract.
- **RED PowerWork<sup>SM</sup>**, up to 1.0 Mbps downstream service tailored toward home office users and telecommuters that need even more bandwidth for large file-transfers, graphics and other needs. This service also includes one static IP address and one e-mail account. **RED PowerWork** pricing starts at \$129.95 a month with a two-year contract, \$149.95 a month with a one-year contract and \$199.95 a month with no contract.
- **RED Network<sup>SM</sup>**, up to 1.0 Mbps downstream service designed to provide Internet access to many employees working in small businesses or remote offices. Six static IP addresses and six e-mail accounts are provided. A Cisco 1605R router, provided by Prism at no additional charge, is required to connect the customer's LAN to **RED Network**. **RED Network** pricing starts at \$299.95 a month with a two-year contract, \$349.95 a month with a one-year contract and \$399.95 a month with no contract.

### About Prism

Prism Communications Services, Inc. is a next-generation communications company with headquarters in New York City. For businesses and individuals alike, Prism is the single source for current and future high-speed data, Internet, video and voice solutions—delivered through the company's advanced digital network. For more information, please visit [www.prismcommunication.net](http://www.prismcommunication.net) or call the company at 212-366-5001. For more information on RED, please visit [www.redconnect.net](http://www.redconnect.net)

# # #

**RED<sup>SM</sup>**, **RED Res<sup>SM</sup>**, **RED Single<sup>SM</sup>**, **RED Network<sup>SM</sup>**, **RED 56<sup>SM</sup>**, and **RED ISDN<sup>SM</sup>**, are trademarks of Prism Communication Services, Inc., formerly Transwire Communications, Inc.



## News Release

[www.nortelnetworks.com](http://www.nortelnetworks.com)

**Draft FOR IMMEDIATE RELEASE**

**October 6, 1999**

### **Prism Selects Nortel Networks' Internet Telephony Solutions for \$460 Million Extension of National High Performance Network**

*Succession Network to facilitate convergence of voice, data and Internet services*

NEW YORK — Prism Communication Services, Inc., a leading integrated communications carrier, and Nortel Networks\* (NYSE/TSE: NT) today announced a contract estimated at up to US\$460 million over two years for Nortel Networks' Internet Telephony solutions.

The contract includes multi-service switching and access equipment and a suite of professional services to support Prism's national rollout of its RED<sup>SM</sup> high-speed voice, data and Internet service and digital network expansion to 33 markets in the U.S. The solution Prism is purchasing will migrate to the Succession\* Network, and Prism will be a lead Succession Network customer.

As Prism launches additional communications services, such as local and long distance telephony, virtual private networks (VPNs), centrex, and other business-specific applications, Succession Network can provide Prism with the flexibility to transition its network architecture to capitalize on emerging technologies and packet-based services.

"We believe we have a distinct advantage by working with Nortel Networks for our complete network," said Dennis Kruse, chief marketing officer of Prism. "Together we are designing for the future so we'll be able to offer services and technologies that address the critical business needs of our customers."

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“Prism has the vision to exploit the benefits of convergence, continually providing its customers with powerful, affordable and reliable new Internet services,” said Al Bender, vice president, Internet Telephony, Nortel Networks. “With the full power of Nortel Networks’ portfolio and professional services, Prism is poised to capitalize on the tremendous opportunities convergence offers and realize the benefits of high performance voice and data networks.”

“Today’s announcement with Prism reinforces Nortel Networks Internet Telephony leadership,” added Bender, noting recent announcements with AT&T, MCIWorldcom, SBC, France Telecom, BT, Airtel and others.

The contract calls for Prism to deploy Nortel Networks DMS\* 500 multi-service switches, Passport\* 15000 ATM-based multi-service switches at the edge and core of the network, AccessNode Express\* equipped with integrated 1-Meg Modem line cards, and the Nortel Networks Service Selection Gateway.

Prism’s current network already employs Nortel Networks’ 1-Meg Modem, which, through RED<sup>SM</sup>, provides high-speed connectivity of up to 1 Megabit (Mbps) to the customer’s premises over traditional copper loops.

In addition to offering high-speed data and voice solutions, Prism intends to incorporate key services of its parent company Comdisco, such as automatic data storage and recovery. Prism also will offer Web hosting and other communications services that will specifically benefit small and medium businesses.

Prism Communication Services, Inc., headquartered in New York City, is a wholly-owned subsidiary of Comdisco, Inc. (NYSE: CDO). Through RED<sup>SM</sup>, its flagship service, Prism is expanding products and geography to become a leading integrated communications carrier, directly offering a total communications solution that includes high-speed connectivity for data, voice, video, Internet and other secure business applications. Designed for small to medium businesses, teleworkers and power users, RED provides tools that enhance its customers’ productivity. For more information, call (888) RED-2000 or visit the Web site at [www.redconnect.com](http://www.redconnect.com).

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Nortel Networks delivers value to customers around the world through Unified Networks\* solutions, spanning mission-critical telephony and IP-optimized networks. Customers include public and private enterprises and institutions; Internet service providers; local, long-distance, cellular and PCS communications companies, cable television carriers, and utilities.

Nortel Networks' common shares are listed on the New York, Toronto, Montreal and London stock exchanges. Nortel Networks had 1998 revenues of US\$17.6 billion and has approximately 70,000 employees worldwide.

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\* Nortel Networks, the Nortel Networks Globemark, Unified Networks, Succession, DMS, AccessNode Express, Passport and *How the world shares ideas* are trademarks of Nortel Networks.

For more information:

Joanne Latham  
Nortel Networks  
919-997-7841  
[joannel@nortelnetworks.com](mailto:joannel@nortelnetworks.com)

Julie Garner  
Ketchum Crescent  
404-287-2000 ext. 175  
[julie.garner@ketchum.com](mailto:julie.garner@ketchum.com)

Debra Niewald  
Prism Communication Services Inc.  
917-305-2133  
[dniewald@prismcsi.net](mailto:dniewald@prismcsi.net)

Or visit Nortel Networks' website at [www.nortelnetworks.com](http://www.nortelnetworks.com)

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**FOR IMMEDIATE RELEASE**

For more information contact:

Patricia GaNun  
Prism Communication Services, Inc.  
(917) 305-2138  
[pganun@prismcsi.net](mailto:pganun@prismcsi.net)

Julie Garner  
Ketchum Crescent  
(404) 287-2000 ext. 175  
[julie.garner@ketchum.com](mailto:julie.garner@ketchum.com)

**Prism Expands RED<sup>SM</sup> Availability Beyond the Core of the Big Apple**  
*Access to high-speed connectivity offers affordable productivity to businesses and teleworkers*

**NEW YORK - July 22, 1999** - Prism Communication Services, Inc., today announced the expansion of its RED<sup>SM</sup> high-speed service to areas adjacent to Manhattan, encompassing the entire New York City metropolitan area. In addition to Manhattan, RED will be available in Brooklyn, Queens, Westchester, Nassau County and Greenwich, Conn. The expansion augments Prism's position as a leading provider of high-speed connectivity in the nation's largest and most dense urban area.

Specifically designed for small to mid-sized businesses, teleworkers, and power users, RED utilizes digital subscriber line (DSL) technology over standard copper telephone wires, providing always-on high-speed connectivity for customers to access the Internet at speeds up to 1 Megabit (Mbps). Secure, dedicated data communications, including high-speed Internet access, allow these customers to compete more effectively in today's business environment by streamlining communications among employees, customers and suppliers, saving precious time and money.

Prism increases its physical coverage to 33 co-locations throughout the metropolitan area using the Nortel Networks<sup>TM</sup> platform. The additional coverage extends RED availability to more than 250,000 small and mid-sized businesses, now offering affordable high-speed access to at least 1.5 million potential business and teleworking customers.

"New York City is the most competitive communications market in the country, so it's imperative that we maintain and extend our geographic coverage," said Dennis Kruse, chief marketing officer, Prism. "We designed RED products and services to empower our customers, so they can focus on running their

businesses not dealing with technology issues. That's a real life benefit that differentiates us from other providers."

Prism offers cost competitive RED pricing and service packages to meet the unique needs of small- to mid-sized businesses, teleworkers and power users:

- RED HomeWork<sup>SM</sup> – a powerful yet economical solution for power users and teleworkers.
- RED PowerWork<sup>SM</sup> – a premium single-user solution for home office and small to mid-sized businesses.
- RED NetWork<sup>SM</sup> – a premium networking solution for growing businesses.

In addition to offering RED high-speed connectivity, Prism intends to incorporate key services of its parent company Comdisco, such as automatic data storage and recovery. In addition Prism will offer Web hosting and other communications services that will specifically benefit small and mid-sized businesses. Additional products could also include turnkey telework solutions and other remote access services for Comdisco's larger Fortune 2000 customers.

"The combined strengths of Prism and Comdisco benefit our respective customers tremendously," said Nicholas K. Pontikes, CEO of Comdisco. "We're able to apply our expertise in vital business services normally reserved for much larger corporations directly to business management tools for smaller companies. Likewise, Prism can parlay its expertise in high-speed access to develop specific remote connectivity solutions for our clients' distributed workforce. That synergy gives our companies and our customers a competitive business advantage."

Prism is in the process of expanding its service availability to 31 additional markets in the U.S. and three markets in Canada throughout the next 12-18 months. The company intends to offer its RED service with voice, video and other products to serve as a single-source communications resource for its customers.

Prism Communication Services, Inc., headquartered in New York City, is a wholly-owned subsidiary of Comdisco, Inc. (NYSE: CDO). Through RED<sup>SM</sup>, its flagship service, Prism is expanding products and geography to become a leading integrated communications carrier, directly offering a total communications solution that includes high-speed connectivity for data, voice, video, Internet and other secure business application. Designed for small to mid-sized businesses, teleworkers and power users, RED provides tools that enhance customer productivity. For more information, call (888) RED-2000 or visit the Web site at [www.redconnect.net](http://www.redconnect.net).





**FOR IMMEDIATE RELEASE**

For more information contact:

Patricia GaNun  
Prism Communication Services, Inc.  
(917) 305-2138  
[pganun@prismcsi.net](mailto:pganun@prismcsi.net)

Julie Garner or Addrian Brooks  
Ketchum Crescent  
(404) 287-2000  
[jgarner@crescomm.com](mailto:jgarner@crescomm.com) or [abrooks@crescomm.com](mailto:abrooks@crescomm.com)

**Prism Introduces \$8 Dial-Up Internet Access**  
*Service makes unlimited 56K access easy and affordable*

**NEW YORK – September 22, 1999** – Prism Communication Services, Inc., a leading integrated communications carrier, today announced the introduction of unlimited 56K Internet access for \$8 per month throughout the metropolitan New York area. This service is available to both residential and business customers and further strengthens Prism's position as a leading provider of quality, affordable Internet access.

The \$8 monthly service fee, considered the lowest in the New York market, includes unlimited 56K Internet access as well as Prism's 24-hour customer service support. In the near future, Prism will also offer a toll-free access number to enable remote access. Further, users will not be bombarded by third party advertising, which often enables other Internet providers to offer access at low prices.

"Our goal with this product is two fold. One, to make Internet access affordable and available to virtually anyone in this city with a computer," said Greg Thomas, vice president of market and product development for Prism. "Secondly, we'll use this product to introduce potential customers to Prism before our high-speed digital access may be available from their particular central office."

Television, radio and outdoor advertising, as well as targeted direct mail, support the launch of the \$8 dial-up promotion. "We've had tremendous success establishing RED<sup>SM</sup> as a brand," said Dennis Kruse, chief marketing officer of Prism. "Ubiquitous Internet access not only strengthens our current product offerings, it opens the door for us to explore complementary services and products for residential and business customers alike."

To facilitate registration and distribution, Prism offers online product ordering and software downloading via the RED Web site at [www.redconnect.com](http://www.redconnect.com).

Prism Communication Services, Inc., headquartered in New York City, is a wholly-owned subsidiary of Comdisco, Inc. (NYSE: CDO). Through RED<sup>SM</sup>, its flagship service, Prism is expanding products and geography to become a leading integrated communications carrier, directly offering a total communications solution that includes high-speed connectivity for data, voice, video, Internet and other secure business applications. Designed for small to mid-sized businesses, teleworkers and power users, RED provides tools that enhance our customers' productivity. For more information, call 888-RED-2000 or visit the Web site at [www.redconnect.com](http://www.redconnect.com).

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## **P R I S M NEWS RELEASE**

**Contact:**

Debra Niewald  
Prism Communication Services, Inc.  
(917) 305-2133  
[dniewald@prismcsi.com](mailto:dniewald@prismcsi.com)

**Contact:**

Julie Garner  
Ketchum/Crescent  
(404)287-2000 ext. 175  
[julie.garner@ketchum.com](mailto:julie.garner@ketchum.com)

***FOR IMMEDIATE RELEASE***

### **Comdisco, Inc. CEO Discusses Nationwide Expansion of Prism Communication Services, Inc.'s High-Speed Data Connectivity, RED<sup>SM</sup>**

**NEW YORK – April 27, 1999** – In a meeting with security analysts today to review its record second quarter earnings, Comdisco, Inc. president and chief executive officer, Nick Pontikes, discussed the planned direction for Prism Communication Services, Inc. The recently acquired Prism offers high-speed data connectivity in Manhattan through its RED<sup>SM</sup> service. Based on the success of market entry and the rising customer demand for high-speed access, Comdisco intends to introduce the RED service nationally, focusing on 32 markets in the U.S. and additional markets in Canada.

Since the service was launched on January 31, 1999 with the "RED MEANS GO" marketing campaign, RED has exploded onto the scene, garnering nearly 42% brand awareness in the New York Metropolitan Area, according to initial market research. Prism has quickly taken a leadership position in providing retail Digital Subscriber Line (DSL) access services to small and mid-sized businesses, power users and telecommuters, offering superior technology supported by attentive customer service.

In addition to launching RED in the new markets, Prism intends to incorporate key Comdisco services, such as business continuity, lifecycle management and Web hosting, into new benefits tailored specifically for small and mid-sized businesses. Other areas of expansion could also include turnkey telecommuting solutions and other remote access services for larger Comdisco customers.

Through RED, Prism offers always-on Internet access over ordinary telephone lines, transforming the way users connect and communicate. RED gives small businesses and customers the same sophisticated communications services that large corporations take for granted. With DSL technology and an advanced Nortel Networks<sup>TM</sup> (NT/TSE: NTL) backbone, RED lets users download data at speeds of up to 1 Megabit per second (Mbps)–17 times faster than analog modems (56K) and roughly eight times faster than dual-channel ISDN–without any per-minute charges.

Prism Communication Services, Inc.  
8 West 19th Street  
New York, New York 10011

Telephone: 212.366.5001  
Facsimile: 212.366.1999  
[www.prismcommunication.net](http://www.prismcommunication.net)



## news release

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### For Immediate Release

Contact: Comdisco, Inc.      Media Contact  
Mary Moster  
847/518-5147  
[mcmoster@comdisco.com](mailto:mcmoster@comdisco.com)

Contact: Prism      Debra Niewald  
Prism Communication Services, Inc.  
917-305-2133  
[dniewald@prismcsi.net](mailto:dniewald@prismcsi.net)

Gil Isenstein or Deborah Souza  
Schwartz Communications, Inc.  
781-684-0770  
[gili@schwartz-pr.com](mailto:gili@schwartz-pr.com)  
[debs@schwartz-pr.com](mailto:debs@schwartz-pr.com)

## COMDISCO STRENGTHENS SERVICES STRATEGY WITH ACQUISITION OF PRISM

*Acquisition of Advanced Communications Provider Complements Strategy to Increase  
Worldwide Service Offerings for High-growth, Next-generation Technologies*

ROSEMONT, Ill.—March 24, 1999—Comdisco, Inc. (NYSE: CDO) announced today that it has acquired Prism Communication Services, Inc., an advanced communications company headquartered in New York City. The terms of the acquisition were not disclosed.

“As Comdisco focuses its services portfolio on high-growth technology services, Prism offers a unique opportunity to offer our customers the best technology infrastructure solutions. We can now couple managed network, lifecycle and business continuity services with next-generation technologies like high-speed data and extranet,” said Nicholas K. Pontikes, president and CEO of Comdisco. “In the coming months, we plan to introduce a new class of integrated voice, data and business continuity services, based on Prism offerings, to existing and new customers worldwide.”

Prism will operate as a wholly-owned subsidiary of Comdisco, expanding the company's service offerings, which now include global leasing, business continuity, and network and lifecycle management services.

Prism recently launched the successful New York City debut of RED—its always-on, fast Internet access using digital subscriber line (DSL) technology that is 17 times faster than the fastest analog modems. Targeted primarily to small businesses, RED offers sophisticated communications services at an affordable cost. In addition, the RED service allows for simultaneous voice and data all over a single standard telephone line.

Based on the successful completion of its New York City deployment, Prism plans to rapidly expand its RED Service. In June 1998, in conjunction with Prism's aggressive strategy to introduce fast Internet service throughout the Northeast corridor of the U.S., Prism awarded Nortel Networks a \$330 million, three-year contract for 30 DMS host systems, associated software and professional services. Prism also recently formed a strategic partnership with BCE Nexxia, Bell Canada's new national IP-broadband solutions company, to deliver Prism's RED Service, as well as a new class of advanced data services, to small business customers and power users in Toronto and Montreal.

"This partnership reflects a shared vision to delivering best-of-breed communications services now," said Terrence Peck, Prism's President and CEO. "As part of Comdisco, Prism will be able to offer its home office and small-to mid-sized business customers the kinds of services Comdisco has traditionally provided to large corporations. In turn, Comdisco can leverage Prism's network to offer large corporations advanced, high-speed data and voice access for mobile and home office employees."

In July 1998, Comdisco committed \$75 million in equity and lease financing for a 25 percent stake in Prism. The company's current executive management will report to Nicholas K. Pontikes, president and CEO of Comdisco.

### About Comdisco

Comdisco Inc. (NYSE:CDO), a technology services company, is one of the world's leading providers of solutions that help organizations reduce technology cost and risk. These services include desktop management; business continuity; network services; Year 2000 testing; equipment leasing and remarketing. For the 12 months ending December 31, 1998, Comdisco's revenues were \$3.4 billion. For more information visit Comdisco's Web site at

<http://www.comdisco.com>

### About Prism

Prism Communication Services, Inc. is a next-generation communications company with headquarters in New York City. For businesses and individuals alike, Prism is the single source for current and future high-speed data, Internet, video and voice solutions—delivered through the company's advanced digital network. For more information, please call the company at 917-305-2000. For more information on RED, please visit [www.redconnect.net](http://www.redconnect.net)